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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,868	04/12/2001	Jori Arrakoski	NC30307	5180

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EXAMINER	
CHANG, RICHARD	
ART UNIT	PAPER NUMBER
2616	

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06/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/833,868	ARRAKOSKI ET AL.	
	Examiner	Art Unit	
	Richard Chang	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02/08/2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 20-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 20-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08/29/2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments and amendments, filed on 02/08/2007, with respect to claims 1-17 and 20-29 have been fully considered but they are not persuasive. Examiner does not withdraw the combined obvious rejection to Liu in view of Maxemchuk.

Claims 18-19 had been canceled.

The following comments fully address applicant's argument with respect to the rejection.

-- Applicant argues the limitation of "at least one of the first-tier nodes forming a first-tier sink node and at least one of the second-tier nodes forming a second-tier sink node and the first tier sink node is capable of communicating with second tier sink node" as recited in claims 1, 5, 8, 11, 15 and 20, (see Remarks, page 8, 3rd paragraph) were not taught by the references US patent 6,980,537 B1 ("Liu") and in view of US patent 5,761,195 A ("Lu et al.") and further in view of US patent 6,219,346 B1 ("Maxemchuk").

First, Liu teaches a two-tier wireless network comprising of a cluster (12) as the first tier of network (2) (a first-tier mesh) of a plurality of nodes (10) designated as a cluster head node and within the first cluster (12) the cluster head (14) is capable of communicating data with the first-tier member nodes as the sink node (See Fig. 1A, Col. 6, lines 44-59), and a backbone network (16) as the second tier of network (2) (a second-tier mesh) of a plurality of the head nodes (14) of different clusters (12) (a

plurality of second-tier nodes) and within a backbone network (16) the head nodes (14) of different clusters (12) (as each of the second-tier nodes of the plurality of second-tier nodes) is capable of communicating data with each other of the second-tier nodes, thus facilitating communications between nodes (14) of different clusters (12) in the backbone network (16) to exchange network connection database between the first tier sink node and second tier sink node (the second-tier sink node further capable of communicating with the first-tier sink node of said first-tier mesh) (See Fig. 1A, Col. 6, line 63 - Col. 6, line 16).

Second, Lu et al. teaches a similar multi-tier mobile network with a more explicit example involving wireless integrated network with sink node wherein the first tier nodes (300, 302...) forms a first-tier mesh and each of the first-tier nodes (300, 302...) is capable of communicating data with member nodes with a sink node (330) and the 2nd tier nodes (326, 328...) forms a 2nd -tier mesh and each of the 2nd -tier nodes (326, 328...) is capable of communicating data with member nodes with a sink node (320) (See Fig. 2A, Col. 6, lines 3-48).

At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Lu et al. with the Liu to obtain a two-tier wireless network and to take advantage of integrating multi-tier wireless network wherein each of the first-tier nodes is capable of communicating data with member nodes with a sink node and the 2nd tier nodes forms a 2nd -tier mesh and each of the 2nd -tier nodes is capable of communicating data with member nodes with a sink node.

In particular, as taught implicitly by Liu et al. or explicitly by Lu et al., it is clear that one of the first tier node acting as the first tier head node provides functions of a first tier sink node and one of the second tier node acting as the second tier head node provides functions of a second tier sink node and there is communication to exchange network connection database between the first tier sink node and second tier sink node. As such the limitation in claims 1, 5, 8, 11, 15, 20, 22, 24 and 26-29 is met since the limitation of "one of the first tier node acting as the first tier head node provides functions of a first tier sink node and one of the second tier node acting as the second tier head node provides functions of a second tier sink node and there is communication to exchange network connection database between the first tier sink node and second tier sink node" is taught by Liu in view of Lu et al. in.

-- Applicant further argues the limitation of " first-tier mesh comprising an ad-hoc mesh with ad-hoc configuration" as recited in claims 1, 5, 8, 11, 15, 20, 22, 24 and 26-29 (see Remarks, page 21, second paragraph).

Liu further teaches and cites reference for wireless ad-hoc cluster network exhibiting an ad-hoc configuration and an ad-hoc number of first-tier nodes (See Col. 8, lines 6-13).

In particular, the first tier cluster formation and adjustment exhibit ad-hoc configuration. As such the limitation in claims 1, 5, 8, 11, 15, 20, 22, 24 and 26-29 is met since the limitation of "first-tier mesh comprising an ad-hoc mesh with ad-hoc configuration" is taught by Liu and Lu et al. in view of Maxemchuk.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

3. Claims 1-17 and 20-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent 6,980,537 B1 ("Liu") and in view of US patent 5,761,195 A ("Lu et al.") and further in view of US patent 6,219,346 B1 ("Maxemchuk").

Regarding claims 1, 15, 20-22, 24 and 26-29, Liu teaches a two-tier wireless network (2 as a wireless access network for providing radio communication of data) (See Fig. 1A) comprising means and steps of

forming a cluster (12) as the first tier of network (2) (a first-tier mesh) of a plurality of nodes (10) and within a cluster (12) the cluster head (14) (each of the first-tier nodes of the plurality of first-tier nodes) is capable of communicating data with member nodes (at least selected others of the first-tier nodes)

wherein one of those cluster member nodes designated as a cluster head node (14) (at least one of the first-tier nodes forming a first-tier sink node) (See Fig. 1A, Col. 6, lines 44-59),

forming a backbone network (16) as the second tier of network (2) (at least a second-tier mesh) of a plurality of the head nodes (14) of different clusters (12) (a plurality of second-tier nodes) and within a backbone network (16) the head nodes (14)

of different clusters (12) (each of the second-tier nodes of the plurality of second-tier nodes) is capable of communicating data with each other (at least selected others of the second-tier nodes),

providing dynamic selection of cluster head nodes within the backbone network (16) (at least one of the second-tier nodes forming a second-tier sink node) , and

facilitating communications between nodes (14) of different clusters (12) in the backbone network (16) to exchange network connection database between the first tier sink node and second tier sink node (the second-tier sink node further capable of communicating with the first-tier sink node of said first-tier mesh) (See Fig. 1A, Col. 6, line 63 - Col. 6, line 16).

Liu teach substantially all the claimed invention but did not disclose expressly the particular application involving wireless integrated network with sink node on each tier.

Lu et al. teaches a similar multi-tier mobile network which discloses a discrete example for the above discussion wherein the first tier nodes (300, 302...) forms a first-tier mesh and each of the first-tier nodes (300, 302...) is capable of communicating data with member nodes with a sink node (330) and the 2nd tier nodes (326, 328...) forms a 2nd -tier mesh and each of the 2nd -tier nodes (326, 328...) is capable of communicating data with member nodes with a sink node (320) (See Fig. 2A, Col. 6, lines 3-48).

At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Lu et al. with the Liu to obtain a two-tier wireless network and to take advantage of integrating multi-tier

wireless network wherein each of the first-tier nodes is capable of communicating data with member nodes with a sink node and the 2nd tier nodes forms a 2nd -tier mesh and each of the 2nd -tier nodes is capable of communicating data with member nodes with a sink node.

The motivation to do so would have been to integrate multi-tier wireless network wherein each of the first-tier nodes is capable of communicating data with member nodes with a sink node and the 2nd tier nodes forms a 2nd -tier mesh and each of the 2nd -tier nodes is capable of communicating data with member nodes with a sink node, as suggested by Lu et al. Col. 6, lines 3-48.

Liu and Lu et al. teach substantially all the claimed invention but did not disclose expressly the particular application involving wireless integrated with wired network for the wireless access.

Maxemchuk teaches wireless network (90) integrated with wired network (100) for the wireless access (See Fig. 2, Col. 4, lines 13-38).

At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Maxemchuk with the Liu and Lu et al. to obtain a two-tier wireless network and to take advantage of wireless integrated with wired network for the wireless access.

The motivation to do so would have been to integrate wireless with wired network for the wireless access, as suggested by Maxemchuk Col. 4, lines 13-38.

Regarding claim 2, as discussed above, this claim has limitations that are similar to those of claim 1 and Liu further teaches that the first-tier nodes (10) of said first-tier mesh (12) are operable pursuant to first-tier-mesh operational characteristics (operational characteristics suitable to the local range node communication), and wherein the second-tier nodes (14) of said second-tier mesh (16) are operational pursuant to second-tier-mesh operation characteristics, the first-tier-mesh operational characteristics and the second-tier-mesh operation characteristics (operational characteristics suitable to the long range node communication) being, at least in some part, dissimilar (See Fig. 1A, Col. 6, line 63 - Col. 6, line 16), thus it is rejected with the same rationale applied against claim 1 above.

Regarding claim 3, as discussed above, this claim has limitations that is similar to those of claim 2 and Liu further teaches that the first-tier-mesh (12) operation characteristic comprise a first frequency band within which communication of data is effectuated (first transmission frequency), wherein the second-tier-mesh (16) operation characteristics comprise a second frequency bandwidth within which communication of data is effectuated (second transmission frequency), the first frequency bandwidth and the second frequency bandwidth having at least plurality nonoverlapping portions may be different) (See Fig. 1A, Col. 6, line 63 - Col. 6, line 16), thus it is rejected with the same rationale applied against claim 2 above.

Regarding claim 4, Liu further teaches that the head node (14) (at least one first-tier node) of the cluster (12) (said first-tier mesh) and the cluster head nodes (14) (at least one second tier node) of the backbone network (16) (said second-tier mesh) are co-located, the head node (14) of the cluster (12) (the at least one first-tier node co-located with the at least one second-tier node) capable of communicating with a plurality of nodes (10) within the cluster (12) (at least selected others of the first-tier-nodes) and the cluster head nodes (14) of the backbone network (16) (at least one second-tier node co-located with the at least one first-tier node) capable of communicating with the head nodes (14) of different clusters within a backbone network (16) (at least selected others of the second-tier nodes) (See Fig. 1A, Col. 6, line 63 - Col. 6, line 16).

Regarding claims 5 and 23, Liu further teaches an ad-hoc mesh, which exhibits an ad-hoc configuration and an ad-hoc number of first-tier nodes (See Col. 8, lines 6-13).

Regarding claims 6-7, Maxemchuk further teaches that the first-tier nodes comprises mobile nodes (mobile unit) capable of movement throughout a selected area (95 service area neighborhood) and which is effectuated pursuant to non line of sight communication techniques (based on mobile station) (See Fig. 1, Col. 2, lines 39-54).

At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Maxemchuk with

the Liu and Lu et al. to obtain a two-tier wireless network and to take advantage of mobile unit capable of movement throughout a service area neighborhood.

The motivation to do so would have been to have mobile unit capable of movement throughout a service area neighborhood, as suggested by Maxemchuk in Col. 2, lines 39-54.

Regarding claim 8 and 25, Maxemchuk further teaches that second-tier mesh (80) comprises a pre-configured mesh (fixed wired router node), which exhibits a fixed configuration and a fixed number of second-tier nodes (See Fig. 2, Col. 4, lines 15-42).

At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Maxemchuk with the Liu and Lu et al. to obtain a two-tier wireless network and to take advantage of pre-configured wired router node for a fixed configuration and a fixed number of second-tier nodes.

The motivation to do so would have been to have pre-configured wired router node for a fixed configuration and a fixed number of second-tier nodes, as suggested by Maxemchuk in Col. 4, lines 15-42.

Regarding claims 9-10, Maxemchuk further teaches that the second-tier nodes are stationary (fixed wired router) and effectuated pursuant to line of sigh communication techniques (based on fixed position) (See Fig. 2, Col. 4, lines 15-42).

At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Maxemchuk with the Liu and Lu et al. to obtain a two-tier wireless network and to take advantage of the second-tier nodes being fixed wired and effectuated pursuant to line of sigh communication techniques based on fixed position.

The motivation to do so would have been to have the second-tier nodes being fixed wired and effectuated pursuant to line of sigh communication techniques based on fixed position, as suggested by Maxemchuk in Col. 4, lines 15-42.

Regarding claim 11, Liu further teaches that a third-tier mesh (170) formed of a plurality of third-tier nodes (15), each of the third-tier nodes of the plurality of third-tier nodes capable of communicating data with at least selected others of the third-tier nodes, at least one of the third-tier nodes forming a third-tier sink node (See Fig. 8, Col. 14, lines 29-45).

Regarding claim 12, Liu further teaches that the first-tier nodes (10) of said first-tier mesh (12) are operable pursuant to first-tier-mesh operational characteristics (operational characteristics suitable to the local range node communication), and wherein the second-tier nodes (14) of said second-tier mesh (16) are operational pursuant to second-tier-mesh operation characteristics, the first-tier-mesh operational characteristics and the second-tier-mesh operation characteristics (operational characteristics suitable to the long range node communication) being, at least in some

part, dissimilar (See Fig. 1A, Col. 6, line 63 - Col. 6, line 16) and it would be obvious applicable to tier.

Regarding claims 13-14, this claim has limitations that is similar to those of claims 8 and 11 and it would be obvious applicable to tier 3 with fixed number of point-to-point or LOS nodes, thus it is rejected with the same rationale applied against claims 8 and 11 above.

Regarding claim 16, Maxemchuk further teaches an other of the second-tier nodes (83) of said second-tier mesh (80) positioned between the first second-tier sink node (81) and the second second-tier sink node (85), communications between the first and second second-tier sink nodes effectuated by way of the other of the second-tier nodes (See Fig. 2, Col. 4, lines 13-38).

. At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Maxemchuk with the Liu and Lu et al. to obtain a two-tier wireless network and to take advantage of an other of the second-tier nodes of second-tier mesh positioned between the first second-tier sink node and the second second-tier sink node.

The motivation to do so would have been to position an other of the second-tier nodes of second-tier mesh between the first second-tier sink node and the second second-tier sink node, as suggested by Maxemchuk Col. 4, lines 13-38.

Regarding claim 17, Liu further teaches that data communicated between the first-tier nodes of said first-tier mesh (12) is communicated at a first data rate (first frequency), wherein data communicated between the second tier nodes of said second-tier mesh (16) is communicated at a second data rate (second frequency), the second data rate greater than the first data rate (backbone data rate higher) such that data communicated between the first and second first-tier sink nodes is communicated more quickly by way of the first and second second-tier sink nodes than by way of the first-tier nodes of said first-tier mesh (See Fig. 1A, Col. 6, lines 45-54).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Chang whose telephone number is (571) 272-3129. The examiner can normally be reached on Monday - Friday from 8 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached on (571) 272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

rkc

Richard Chang
Patent Examiner
Art Unit 2616

5/23/07

WING CHAN
SUPERVISORY PATENT EXAMINER